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| EXAMINER | |
|---|---|
| JOSEPH, JAISON | |

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| 2611 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

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| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/601,591 | MURAKAMI ET AL. | |
| | Examiner | Art Unit | |
| | Jaison Joseph | 2611 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *29 November 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *35-38,41,42,45-48,51,52 and 55-59* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *35-38,41,42,45-48,51,52 and 55-59* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments with respect to claims 35 – 38, 41, 42, 45 – 52, and 55 – 59 have been considered but are moot in view of the new ground(s) of rejection.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 35 – 38, 45 – 48, 58 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jasper et al. (US Patent 5,381,449) in view of Weaver Jr. (US Patent 5,506,865).

Regarding claim 35, Jasper et al teach a method of transmitting a digital data stream in a digital wireless communications system, the method comprising the steps of: converting said digital data stream into a first stream of information symbols having four or more signal points on a signal constellation defined by a modulation scheme which is either QPSK or $2^m$ QAM (m being an integer and takes a value of 3 or more) (see figure 5A and figure 6, and column 6, line 23 – column 7, line 25); generating a pilot symbol of which a signal point on the signal constellation has an amplitude larger than amplitudes of possible signal points of the first stream on said signal constellation and differs in phase from a particular signal point of the first stream having a maximum possible amplitude among the signal points of the first stream of the information

symbols on said signal constellation, wherein the pilot signal is disposed on either an in-phase or quadrature phase axis in said signal constellation (see figure 6, elements 84,and column 6, line 59 – column 7, line 25); inserting said pilot symbol regularly in said first stream of said information symbols to generate a second symbol stream (see figure 5A components 107 –110); and transmitting a modulated version of said second symbol stream by wireless (see figure 5A). Jasper et al doesn't expressly teach the pilot symbol is always disposed on in-phase or quadrature axis. However it would be obvious to an ordinary skilled in the art at the time the invention was made to have the pilot signal is being disposed only on in-phase or quadrature axis since applicant does not disclose having the pilot signal disposed on an axis provides an advantage, is used for a particular purpose, or solves a stated problem.

Jasper et al does not expressly teach wherein the amplitude of the pilot signal takes a constant value which is larger than that of any possible signal point; However it would be obvious to an ordinary skilled in the art at the time the invention was made to have the pilot signal to have value larger than any signal point. It is important to correctly identify the pilot signals, so that based on the pilot signals to accurately detect the data signals. Higher the amplitude of the signal causes to have higher signal to noise ration on the received signals. When the signal to noise ratio is high the signals are detected with greater accuracy. Further Weaver Jr. teaches the pilot signal is typically transmitted at greater signal strength than the data signals (see figure 2 and column 3, lined 50 – 56). Therefore it would have been obvious to an ordinary skilled in the art at the time the invention was made to have the amplitude of the pilot signal takes

a constant value which is larger than that of any possible signal point. The motivation or suggestion to do so is that since the pilot signal is much stronger than the data signal it can be used as an accurate phase reference for signal processing.

Regarding claim 36, which inherits the limitations of claim 35, Jasper et al in view of Weaver Jr. do not expressly disclose generating a pilot symbol includes the step of setting the amplitude of the pilot symbol not larger than 1.6 times the maximum possible amplitude. However the pilot signals of Jasper et al are greater than the maximum possible amplitude of the information signal and could have a limitation such as 1.6 times maximum possible amplitude of the information signal since applicant does not disclose setting the amplitude to 1.6 times the information signal provides an advantage, is used for a particular purpose, or solves a stated problem. There fore it would have been obvious to an ordinary skilled in the art at the time the invention was made to have the pilot symbol not larger than 1.6 times maximum possible amplitude of said information symbols.

Regarding claim 37, which inherits the limitations of claim 35, Jasper et al further teach wherein said modulation scheme is a quadrature amplitude modulation (see figure 6).

Regarding claim 38, which inherits the limitations of claim 36, Jasper et al further teach wherein said modulation scheme is a quadrature amplitude modulation (see figure 6).

Regarding claim 45, the claimed transmitter including the features correspond to subject matter mentioned in above rejection of claim 35 is applicable hereto.

Regarding claim 46, which inherits the limitations of claim 45, the claimed transmitter including the features correspond to subject matter mentioned in above rejection of claim 36 is applicable hereto.

Regarding claim 47, which inherits the limitations of claim 45, the claimed transmitter including the features correspond to subject matter mentioned in above rejection of claim 37 is applicable hereto.

Regarding claim 48, which inherits the limitations of claim 46, the claimed transmitter including the features correspond to subject matter mentioned in above rejection of claim 38 is applicable hereto.

Regarding claim 58, A method of transmitting a digital data stream in a digital wireless communications system, the method comprising the steps of: converting said digital data stream into a first stream of information symbols having four or more signal points on a signal constellation defined by a modulation scheme which is either QPSK or 2m - QAM (m being an integer and takes a value of 3 or more) (see figure 5A and figure 6, and column 6, line 23 – column 7, line 25); generating a pilot symbol of which a signal point on the signal constellation has an amplitude larger than amplitudes of possible signal points of the first stream on said signal constellation, wherein said pilot symbol is disposed on either an in-phase axis or a quadrature-phase axis in said signal constellation (see figure 6, elements 84,and column 6, line 59 – column 7, line 25); inserting said pilot symbol regularly in said first stream of said information symbols to generate a second symbol stream(see figure 5A components 107 –110); and transmitting a modulated version of said second symbol stream by wireless 9see figure

5A) Jasper et al doesn't expressly teach the pilot symbol is always disposed on in-phase or quadrature axis. However it would be obvious to an ordinary skilled in the art at the time the invention was made to have the pilot signal is being disposed only on in-phase or quadrature axis since applicant does not disclose having the pilot signal disposed on an axis provides an advantage, is used for a particular purpose, or solves a stated problem.

Jasper et al does not expressly teach wherein the amplitude of the pilot signal takes a constant value which is larger than that of any possible signal point; However it would be obvious to an ordinary skilled in the art at the time the invention was made to have the pilot signal to have value larger than any signal point. It is important to correctly identify the pilot signals, so that based on the pilot signals to accurately detect the data signals. Higher the amplitude of the signal causes to have higher signal to noise ration on the received signals. When the signal to noise ratio is high the signals are detected with greater accuracy. Further Weaver Jr. teaches the pilot signal is typically transmitted at greater signal strength than the data signals (see figure 2 and column 3, lined 50 – 56). Therefore it would have been obvious to an ordinary skilled in the art at the time the invention was made to have the amplitude of the pilot signal takes a constant value which is larger than that of any possible signal point. The motivation or suggestion to do so is that since the pilot signal is much stronger than the data signal it can be used as an accurate phase reference for signal processing.

Regarding claim 59, the claimed transmitter including the features correspond to subject matter mentioned in above rejection of claim 58 is applicable hereto.

Claims 41, 42, 51, 52, and 55 – 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jasper et al. (US Patent 5,381,449) in view of Weaver Jr. (US Patent 5,506,865) and further in view of Wright (US Patent 5,809,083).

Regarding claim 41, which inherits the limitations of claim 35, Jasper et al in view of Weaver Jr. do not expressly teach the modulation scheme is quadrature phase shift keying. However in analogous art Wright teaches PSK modulation (see column 5, lines 5 – 33). Therefore it would be obvious to an ordinary skilled in the art at the time the invention was made to use PSK modulation. The motivation or suggestion to do so is to comply with a communication standard.

Regarding claim 42, which inherits the limitations of claim 41, Jasper et al in view of Weaver Jr. and Wright do not expressly disclose generating a pilot symbol includes the step of setting the amplitude of the pilot symbol not larger than 1.6 times the maximum possible amplitude. However the pilot signals of Jasper et al in view of Wright are greater than the maximum possible amplitude of the information signal and could have a limitation such as 1.6 times maximum possible amplitude of the information signal since applicant does not disclose setting the amplitude to 1.6 times the information signal provides an advantage, is used for a particular purpose, or solves a stated problem. There fore it would have been obvious to an ordinary skilled in the art at the time the invention was made to have the pilot symbol not larger than 1.6 times a maximum possible amplitude of said information symbols.

Regarding claim 51, which inherits the limitations of claim 45, the claimed transmitter including the features correspond to subject matter mentioned in above rejection of claim 41 is applicable hereto.

Regarding claim 52, which inherits the limitations of claim 51, the claimed transmitter including the features correspond to subject matter mentioned in above rejection of claim 42 is applicable hereto.

Regarding claim 55, Wright further teach a receiver that is configured to receive said second symbol stream from said modulated version of said second symbol stream (see figure 5, the receiver 500); an estimating unit that is configured to estimate, by said pilot signal, an amplitude distortion of information symbols between said pilot signal and a next pilot symbol in said second symbol stream (see figure 5, components 518, 520, 530 and see column 9, lines 19 – column 11, line 30); a removing unit that is configured to remove said amplitude distortion from said information symbols following said pilot symbol in said second symbol stream by using said estimated amplitude distortion to obtain amplitude-distortion-compensated information symbols (see figure 5 component 522 and see column 9, lines 19 – column 11, line 30); and a deciding unit that is configured to decide a digital symbol associated with each of said obtained amplitude-distortion-compensated information symbols according to said signal constellation (see figure 5, component 524 and see column 9, lines 19 – column 11, line 30).

Regarding claim 56, Wright et al further teach a receiver that is configured to receive said second symbol stream from said modulated version of said second symbol stream (see figure 5, the receiver 500); an estimating unit that is configured to estimate,

by said pilot signal, a phase offset between the transmitter and the receiver (see figure 5, components 518, 520, 530 and see column 9, lines 19 – column 11, line 30); a removing unit that is configured to remove phase offset from said information symbols following said pilot symbol in said second symbol stream by using said estimated phase offset to obtain phase-offset-compensated information symbols (see figure 5 component 522 and see column 9, lines 19 – column 11, line 30); and a deciding unit that is configured to decide a digital symbol associated with each of said obtained phase-offset-compensated information symbols according to said signal constellation (see figure 5, component 524 and see column 9, lines 19 – column 11, line 30).

Regarding claim 57, which inherits the limitations of claim 55, the claimed transmitter including the features correspond to subject matter mentioned in above rejection of claim 56 is applicable hereto.

## ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jaison Joseph whose telephone number is (571) 272-6041. The examiner can normally be reached on M-F 9:30 - 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jaison Joseph
01/24/2008

CHIEH M. FAN
SUPERVISORY PATENT EXAMINER